بسم الله الرحمن الرحيم

Leptospiral Nephropathy

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Agenda

- Case scenario.
- Overview on Leptospirosis.
- Renal involvement in leptospirosis.
- Management .

Case scenario

Personal history:

- Ahmed Arfa , 20years old,
- From Elgamalia, Dakahleia,
- Fisherman ,
- Single,
- Cigarette smoker(20cig /day for 5y) .

Complaint

- ✓ Fever 1week ago
- ✓ Yellowish discoloration of the sclera 4 days ago

- The condition started 1week ago by acute onset and remittent course of fever,
  - Low grade
  - Continuous allover the day,
  - more at night ,not ass. With chils.
  - improved by analgesics and antipyretics,
  - associated with myalgia, bone pains, generalized weakness and recurrent presyncope.

3 day latter :

- Jaundice :

of progressive course ; with dark urine ; normal stool ; periamblical pain

- Hemoptysis:

recurrent attacks ; small in amount ;improved spontaneously.

The pt admitted in

- Tropical hospital in Damietta;(IV fluides).
- Chest hospital (noradrenaline infusion)

Then referred to our hospital(MUH)

On examination:

Conscious,
jaundiced,
hypotensive100/60,
dehydrated ,

otherwise normal.

Investigatios:

CBC

- **HGB:** 10 g/dL.(microcytic)
- **PLT:** 18 x 10^3 /uL.
- **WBCs:** 18,200 /uL.(92% neutrophils)

S.BIL: T. 23.8 D. 18

Albumin : 2.7

AST: 62

ALT : 41

ALKP: normal

INR normal

Bl suger : normal

- S. Creatinine : 3.5
- ABG:
  - PH :7.29
  - HCO3:21
  - PCO2:45
- Na: 135
- K:3.1
- S LDH:1026U/L (N up to 480).

- Urine ex.:

Protein : +

Glucoge :+

Bilirubin : +

Cast : granular – RBCs

Pus cells : 15

- HCV Ab: *negative .*
- HBs Ag: *Negative.*
- HAV IGM : *Negative.*

- ANA : NEGATIVE
- ANCA (P and C ANCA): NEGATIVE
- Anti LKM : NEGATIVE
- Anti smith ab : NEGATIVE

OTHER INVESTIGATIONS

- **Abd. US:** Normal
- **chest x- ray :** normal
- **ECHO :** NORMAL
- **BLOOD CULTURE :** NORMAL

Summary

A 20-year-old male with

- ***Fever***
- ***Jaundice***
- ***Hypotension@ dehyd.***
- ***Thrombocytopenia***
- ***AKI***
- ***Hypokalemia***

Management

- Antibiotics :

  iv Ceftriaxone +Doxycycline

- Haemodynamic @ inotropic support with dopamine and noradrenaline infusion + iv fluid

10 days after ttt :

S.creatinine : normalized

S. bilirubin : improving

Platelet count : improving

Generally well

Haemodynamically stable

Still Jaundiced

Leptospirosis

Introduction

- Leptospirosis is a zoonosis caused by *Leptospira,* an obligate aerobic spirochete of worldwide distribution

Risk Groups

- **Occupational hazard**

Miners, Sewer workers, Farmers, Vets, Fishermen – Inland (not on the sea) , rice field workers, soldiers etc.

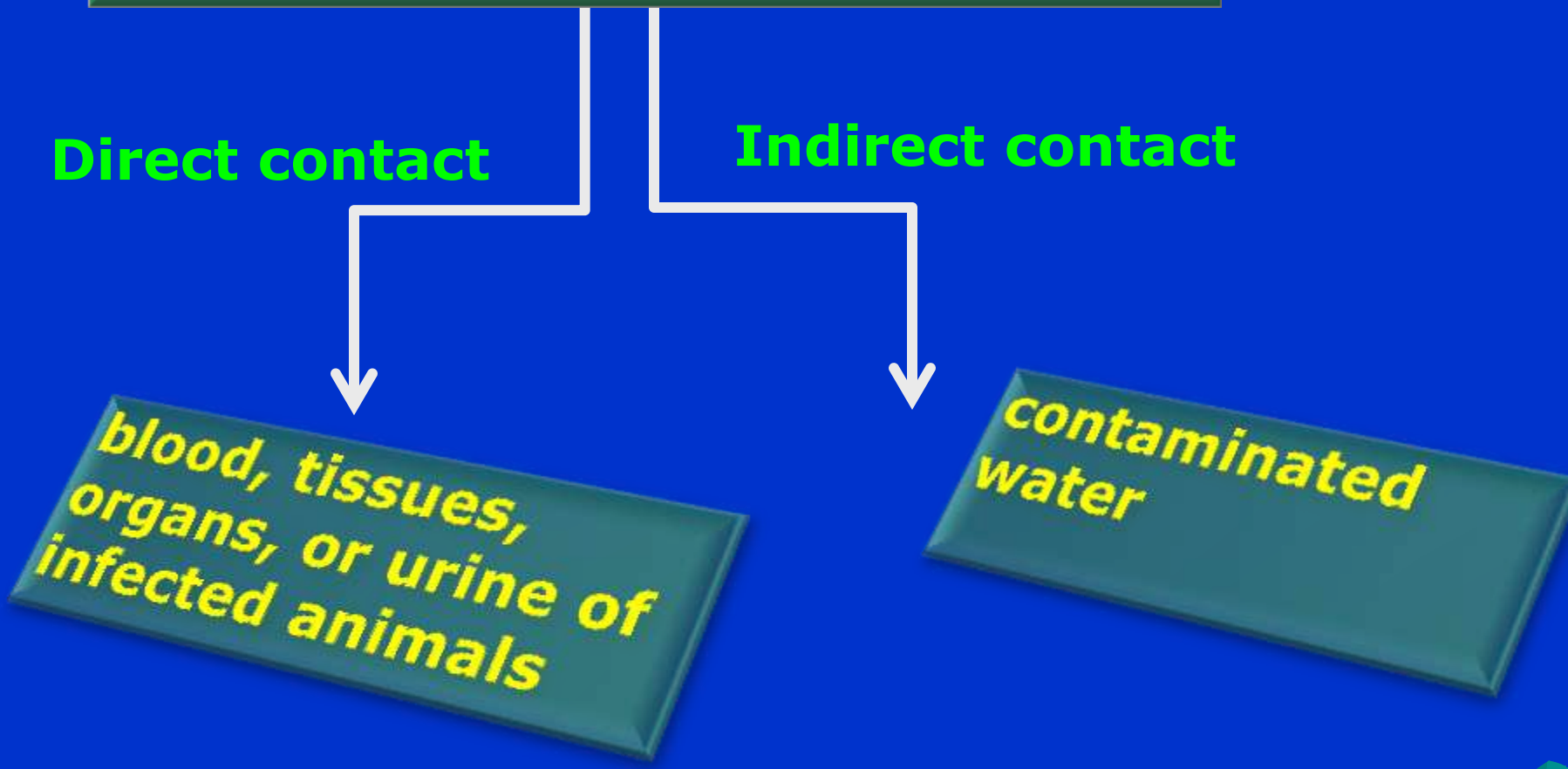
Reservoirs of Infection

- Wild mammals are the maintenance host or primary reservoir for the spirochetes

(Rats/rodents, cats, livestock, raccoons, dogs etc)

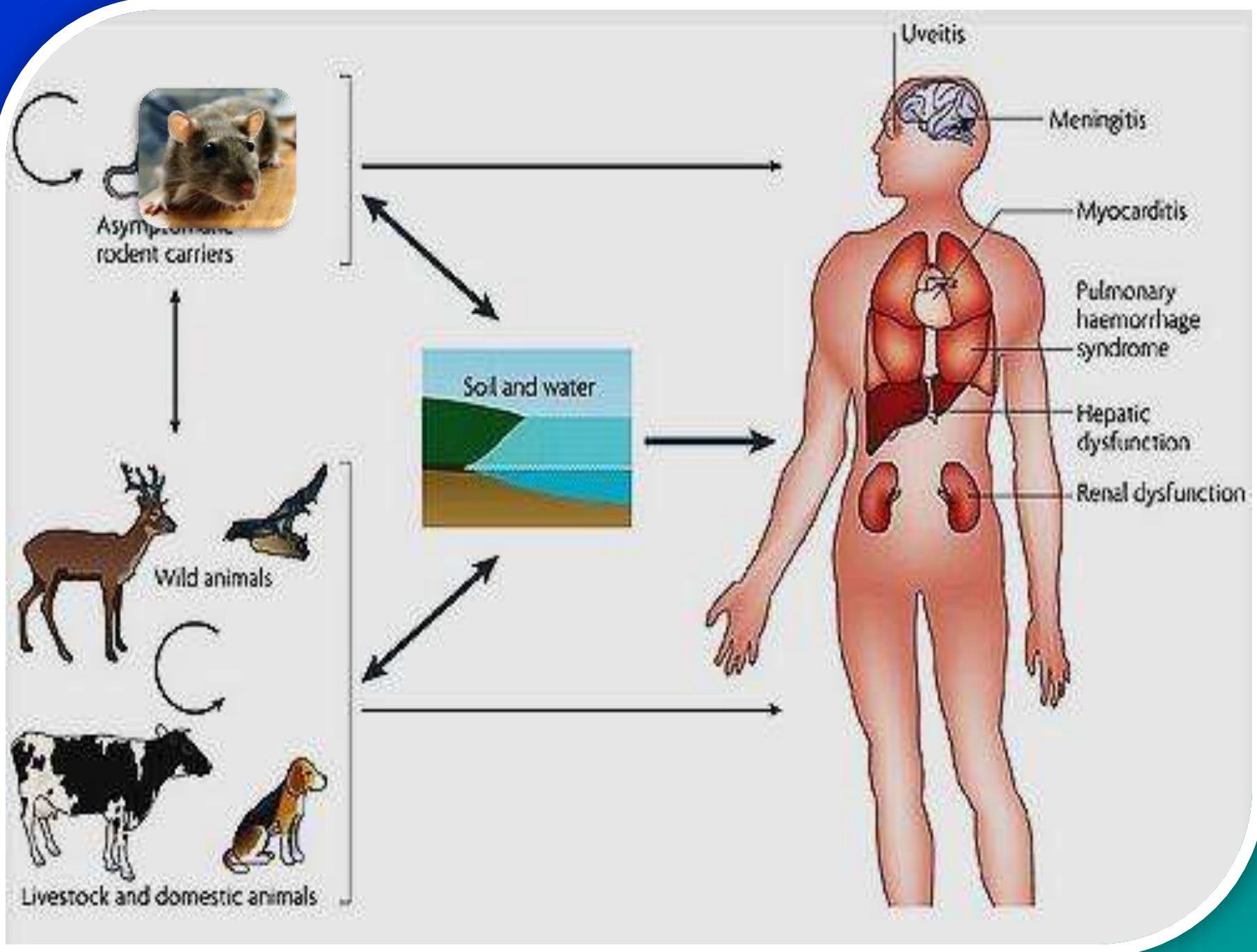
- Pathogenic leptospires are maintained in nature in the renal tubules of this animals.

Modes of Transmission



Human infection is accidental

No human to human transmission


Asymptomatic rodent carriers
Soil and water
Wild animals
Livestock and domestic animals
Uveitis
Meningitis
Myocarditis
Pulmonary haemorrhage syndrome
Hepatic dysfunction
Renal dysfunction

Clinical Presentation and Diagnosis

Diagnostic challenges, especially in early phase : non-specific presentation

Diagnosis of leptospiros depend on a high index of suspicion .

Clinical Features

- Incubation Period: usually 5-14 days
- Biphasic clinical course

–Acute or septicemic phase (1 week)

–Immune phase when antibodies are produced and leptospires are excreted in the urine (6days-4weeks)

- Most complications are associated with localisation of leptospires within the tissue during the immune phase

Clinical syndromes

Anicteric Leptospirosis

- Self limiting, symptoms non specific
- Majority of infection(85-90% of cases)
- Usually lasts 1-2 weeks
- Aseptic meningitis seen in 25-50%
- Mortality is extremely rare

Icteric Leptospirosis(Weil's disease)

- 5-10% of patients with leptospirosis
- 5-15% mortality
- Jaundice, renal failure, (pulmonary) haemorrhage
- Other organs –cardiac, ocular,, cholecystitis, pancreatitis

Renal involvement in leptospirosis

- Leptospira is a kidney-prone micro-organism.
- kidney is the main target of leptospira in both acute and chronic infection

Clinical manifestations

- **Subclinical course:**

  mild proteinuria

  urinary sediment (Leukocytes, red blood cells , Biliary pigments and granular casts)

TO

- Severe AKI.

AKI

- Usually presents with a rapid elevation in serum urea and creatinine.

- Usually presents in the **non-oliguric** form .

- **Tubulo-interstitial nephritis** is the principle renal lesion:

(Proximal tubular dysfunction, augmenting distal sodium delivery, and, consequently, potassium excretion by the intact distal tubule.)

- **Hypokalemia** is a frequent finding in AKI of leptospirosis (41-45%) of pts.

- **Hemodynamic abnormalities:**

dt hypovolemia (dehydration + direct effects of leptospiral toxins that damage the vascular endothelium and increase permeability).

- **Hemorrhagic manifestations:**

(ocular suffusion, petechiae, pulmonary hemorrhage, GIT hemorrhage, and hematuria).

- **Thrombocytopenia** :>70% of cases.

- **High bilirubin** is associated with the presence and severity of AKI.

- **Thrombocytopenia**(>70%)

(an association or severe endotoxin injury).

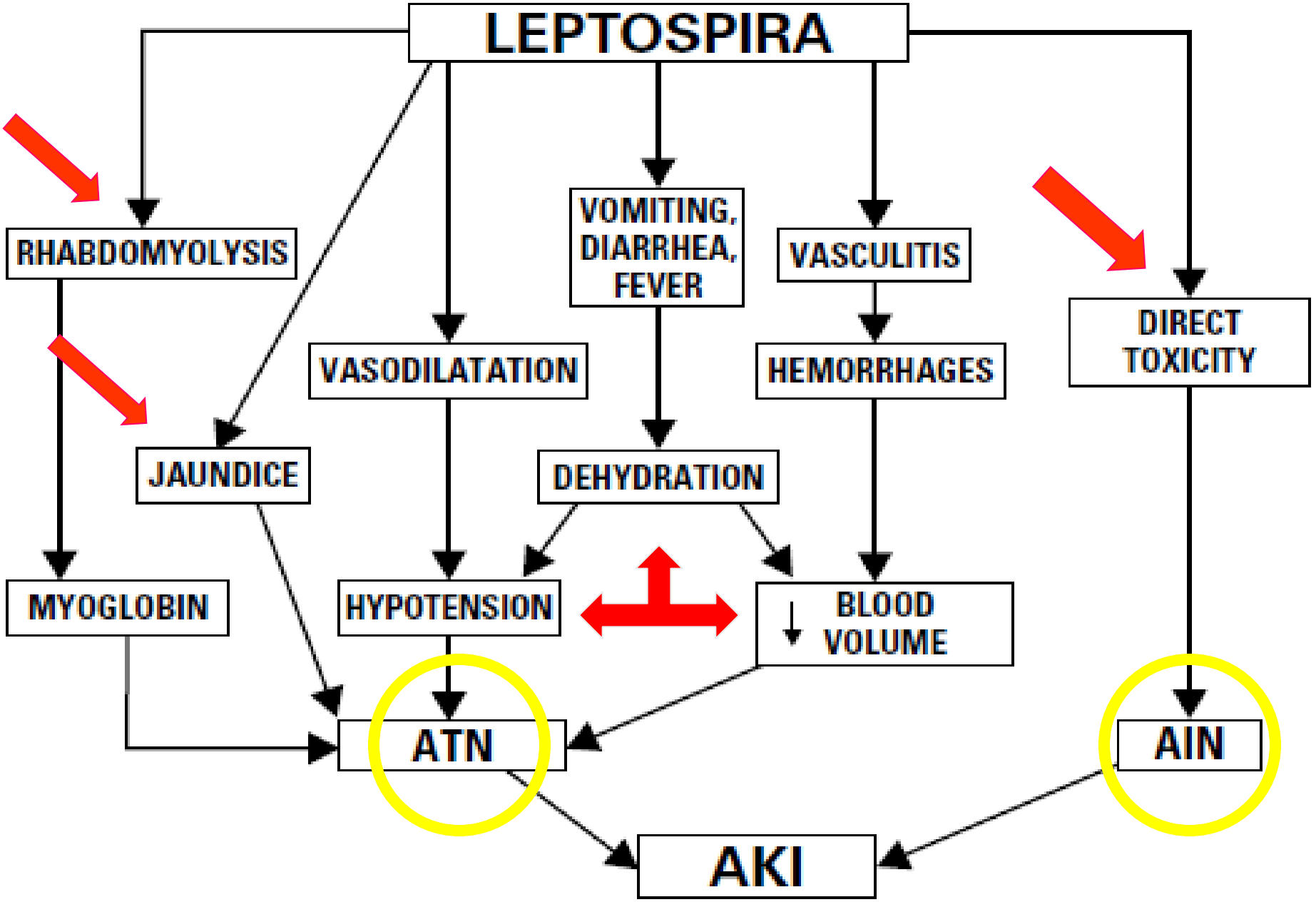
- **Tubular atrophy and interstitial fibrosis**, if chronic leptospiral infection remain untreated.

Pathogenesis

Main factors in the pathogenesis of the renal lesions are

- The micro-organisms,
- Their virulent toxins,
- Induction of immune response.

Physiopathology of AKI in leptospirosis.



Laboratory diagnosis.

The disease is usually diagnosed by

1. –Detecting antibodies
2. –Culturing (blood, urine or tissues)
3. –PCR
4. –Immunostaining

MAT-Microscopic agglutination test

- **"gold standard" of serodiagnosis**

- Sensitivity 92% Specificity 95%
- Sero conversion or 4 fold rise/ high titer
- Unable to differentiate between agglutinating antibodies due to current, recent or past infections

ELISA

- Popular.
- Detect IgM antibody and sometimes also IgG antibodies in the early phase of the disease.
- ELISA results should be confirmed by the MAT.

DD

Fever

Viral fever, Malaria, Typhus

Jaundice

Malaria, Viral hepatitis, Sepsis

Renal Failure

Malaria, Hanta virus, Sepsis

Meningitis

Bacterial / Viral causes

Hemorrhagic Fever

Dengue, Hanta virus, Typhus

Treatment

- Should be initiated as soon as the diagnosis of leptospirosis is suspected.

- Early treatment is very important (preferably before the fifth day after the onset of illness).

- **Antibiotics**

✓ Doxycycline

shortened illness by 2days.

✓ Penicillin

used in severe leptospirosis, shorten duration of fever, improved renal function quicker.(1,5milion U / 6 h/7days).

✓ Both prevented shedding of Leptospira into urine.

✓ 3rd generation ceph(as ceftriaxone and cefotaxime), and quinolone.

- Severe cases: high doses IV penicillin

- Less severe cases -oral antibiotics eg. amoxycillin, ampicillin, doxycycline, erythromycin, azithromycin

Renal replacement therapy

- **Early dialysis:** reduce the mortality rate, shorter time of recovery, and a faster reduction in bilirubin, urea, and creatinine
- **All dialysis modalities** cane be used, (hemodialysis, peritoneal dialysis, and hemoperfusion).

Plasma exchange:(Case reports)

Adjunctive therapy for patients with severe icteric leptospirosis

(severe hyperbilirubinaemia)complicated by ARF , who have not shown rapid clinical response to conventional treatment (antibiotics and haemodiafiltration)

Steroids:

Case series analysing the benefits of methylprednisolone in pulmonary leptospirosis

Conclusion

- Clinicians must be more aware of Leptospirosis
  - Nonspecific clinical presentation
  - Difficult laboratory diagnosis
- Consider Leptospirosis as a differential diagnosis for any undifferentiated febrile illness
- Early detection leads to early treatment with antibioticsand other supportive measures including respiratory support


Thank
You!!